AMENDMENTS TO THE SPECIFICATION AND ABSTRACT

Please amend the paragraph beginning at page 9, line 10 as follows.

Flowing and stopping the flow of ambient gas are repeatedly switched between the first and second gas detection units. The switch between flowing and stopping the flow of ambient gas is achieved by using a three-way valve connected between a pump and the ionization chamber of each of the gas detection units.

Please amend the paragraph beginning at page 10, line 20 as follows.

Referring Figs. 2 and 4, gas detection unit 110 includes a UV lamp 32, which is sealed by an envelope 38, an optical window 34, and an ionization chamber 36. UV lamp 32 radiates UV photons or UV light 60 (e.g., light having a wavelength less than about 150 nm) through optical window 34 into ionization chamber 36. Envelope 38, which is preferably made of glass, contains ~~a UV light source (not shown) and~~ a mixture of inert gases such as helium (e.g., 40%), argon (e.g., 30%) and krypton (e.g., 30%), at a reduced pressure (e.g., 25 Torr). Exemplary dimensions for envelope 38 are 0.10-1.00 inch in diameter and 0.20-2.00 inch in length. Optical window 34 is disposed at the end of envelope 38 and is made of a single crystal material. Depending on the material of choice for optical window 34, UV light having a desired energy level ~~pass~~ passes through optical window 34. For example, optical window 34 made of lithium fluoride (LiF), magnesium fluoride (MgF_2), barium fluoride (BaF_2), or calcium fluoride (CaF_2) allows the transmission of the UV light of 11.7 electron volts (eV), 10.6 eV, 9.8 eV, or 9.2 eV, respectively. Gas detection unit 110 may be constructed as disclosed in a U.S. Patent ~~Application Serial~~ No. ~~09/271,612~~ 6,313,638, entitled "DUAL-CHANNEL PHOTO-IONIZATION DETECTOR THAT ELIMINATES THE EFFECT OF ULTRAVIOLET INTENSITY ON CONCENTRATION MEASUREMENTS"~~ and filed on March 17, 1999~~, issued November 6, 2001, which is herein incorporated by reference in its entirety.

Please amend the paragraph beginning at page 11, line 25 as follows.

Referring to Fig. 4, the UV photons 60 from UV lamp 32 ionize volatile gas molecules inside ionization chamber 36. Ion detectors 46 and 48 disposed in ionization chamber 36 and

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OF DAVID MILLERS
6560 ASHFIELD COURT
SAN JOSE, CA 95120
PH: (408) 927-6700
FX: (408) 927-6701

positioned proximal to optical window 34 ~~collects~~ collect electrons and ions that result from the ionization of the volatile gas molecules. Each of ion detectors 46 and 48 includes a pair of electrodes, a bias electrode 50 or 54 and a measurement electrode 52 or 56. Bias electrodes 50 and 54 and measurement electrodes 52 and 56 are positioned in an interdigital arrangement. Each of bias and measurement electrodes 50, 54, 52, and 56 has at least a pair of digits, positioned in the interdigital arrangement. It is understood that bias and measurement electrodes 50, 54, 52, and 56 can each have from one to a number of digits. The above-incorporated U.S. Patent ~~Application Serial~~ No. ~~09/271,612~~ 6,313,638 describes in detail the interdigital 10 arrangement, structures and fabrication methods of bias and measurement electrodes 50, 54, 52, and 56.

Please amend the paragraph beginning at page 14, line 15 as follows.

In collecting the electrons and the ions, measurement electrodes 52 and 56 are near ground voltage and separated from bias electrodes 50 and 54 to create an electrical field 58. For instance, bias driver circuit 140 provides a positive bias voltage (e .g ., DC voltage of about 4-120V) to bias electrodes 50 and 54. Measurement driver circuit 150 is connected to measurement electrodes 52 and 56 and measures the electrical currents caused by the collection of the ions, i.e., the measurement currents. The above-incorporated U.S. Pat. No. 5,773,833 ~~patent~~ discloses embodiments of measurement driver circuit 150. Microprocessor 180 communicates with both bias driver circuit 140 and measurement driver circuit 150 and can adjust the bias voltage that bias driver circuit 140 applies to bias electrodes 50 and 54. Measurement driver circuit 150 sends signals indicative of the measurement currents measured at detectors 46 and 48 to microprocessor 180 in order to determine the concentration of the volatile gas molecules. Based on pre-calibration data, microprocessor 180 converts the current signal into an equivalent concentration of gases. Details of the determination of the volatile gas concentration ~~is~~ are disclosed in the above-incorporated U.S. Patent ~~Application Serial~~ No. ~~09/271,612~~ 6,313,638.

Please delete the prior abstract and add the following new abstract.

A photo-ionization detector (PID) including two detection units controls gas flows through the ionization chambers of the detection units for real-time self-cleaning and measurement. Operation of the PID can include flowing gas through the ionization chamber

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OF DAVID MILLERS
[illegible] ASHFIELD COURT
SAN JOSE, CA 95120
PH [illegible]
FX [illegible]

of one detection unit to measure the volatile gas concentration while stopping gas flow through the ionization chamber of the other detection unit. A UV lamp converts oxygen contained in the closed ionization chamber to ozone, which removes contamination in the closed ionization chamber. Continuous gas flows can alternate between one ionization chamber to the other. Alternatively, a PID with only one gas detection unit intermittently interrupts the flow of the ambient gas in the ionization chamber.

THE PATENT LAW OFFICES
OF DAVID MILLERS
6564 ASHFIELD COURT
SAN JOSE CA 95120
PH (408) 927-6718
FX (408) 927-6719